

Northeast Invertebrate Fisheries

INTRODUCTION

Offshore fisheries for crustaceans and bivalve mollusks are among the most valuable of the region's fisheries. For the ninth straight year, U.S. commercial landings of American lobster (27,600 t) and sea scallop (7,500 t) in 1994 ranked first and second in overall ex-vessel value with \$167 million and \$83 million, respectively. Additionally, landings of surfclam, ocean quahog, and northern shrimp contributed another \$61 million in revenue. The combined value of these fisheries exceeds that for all offshore finfish fisheries combined. Four separate fishery management regimes regulate the harvest of these species: the Surf Clam/Ocean Quahog FMP of the Mid-Atlantic FMC, and the Sea Scallop FMP of the New England FMC. The northern shrimp fishery is regulated by the ASMFC. At present, American lobsters are regulated partially under an FMP promulgated by the New England FMC, but individual states are the primary regulators of these fisheries. A comprehensive inshore/offshore management plan for American lobsters is currently under development by the New England FMC.

SPECIES AND STATUS

American Lobster

Comprehensive stock assessments of the American lobster resource, last completed in 1993, indicated fishing mortality rates on the Gulf of Maine resource to be about 20% above the New England FMC's overfishing level. Overfishing of the resource inshore from Cape Cod through Long Island Sound was substantially greater, while the offshore continental shelf portion of the resource was being exploited at approximately the overfishing level. A large fraction of all lobsters landed are sexually immature and fishing mortality rates for both inshore and offshore populations greatly exceed the rates that would provide maximum cohort yields. The intent of management is to increase egg production per recruit through a variety of regulatory measures. At present, American

lobster populations are regulated primarily by a minimum carapace length set at 3¼ inches (83 mm). The New England FMC, in cooperation with the ASMFC, NOAA Fisheries, and the fishing industry, is now considering additional measures that include limitations on numbers of traps, seasonal closures, increases in the size of escape vents, and overall quotas.

Recent average landings of lobsters have been 25,900 t (Table 4-1), with landings in 1994 at about the CPY level. The 1994 harvest (27,600 t) was second only to the record catch of 29,100 t taken in 1991 (Fig. 4-1).

Atlantic Sea Scallop

Sea scallops are harvested on the continental shelf from the Virginia Capes to the Hague Line, separating the U.S. and Canadian portions of Georges Bank, and in the Gulf of Maine. Canadian landings on Georges Bank represent a significant fraction of the total (Fig. 4-2), i.e., 37% (5,800 t) of RAY (Table 4-1). Sea scallops are harvested primarily using epibenthic dredges in the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight. A small but rapidly growing proportion of the landings is taken with otter trawls in the Mid-Atlantic.

Table 4-1.

Northeast Invertebrates

Productivity in metric tons and status of fisheries resources

Species	Recent Average Yield (RAY) ¹	Current Potential Yield (CPY)	Long-Term Potential Yield (LTPY)	Fishery Utilization Level	Stock Level Relative to LTPY
American lobster	25,900	27,500	Unknown	Over	Above
Sea scallop ^{2,3}	15,400	12,500	13,300	Over	Near
Surfclam ²	31,800 ⁴	30,200 ⁴	22,000 ⁵	Full	Above
Ocean quahog ²	22,500	22,000	25,000	Full	Near
Northern shrimp	3,100	5,000	4,000 ⁶	Full	Near
Red crab	800	2,700	2,700	Unknown	Unknown
Total	99,500	99,900	94,500		
U.S. Subtotal Only	93,568	95,056	89,357		

¹ 1992-94 average. Landings for 1994 are incomplete for some areas resulting in underestimated RAYs for some species; for lobsters, preliminary 1994 landings were increased by 25% for calculating this RAY.

² Data for bivalve species are in shucked meat weights.

³ Transboundary stock with Canada, which harvested 37% (5,800 t) of RAY.

⁴ Reflects landings from both inshore and offshore areas.

⁵ Only for the U.S. EEZ.

⁶ Provisional LTPY, based on historical landings pattern (1963-94).

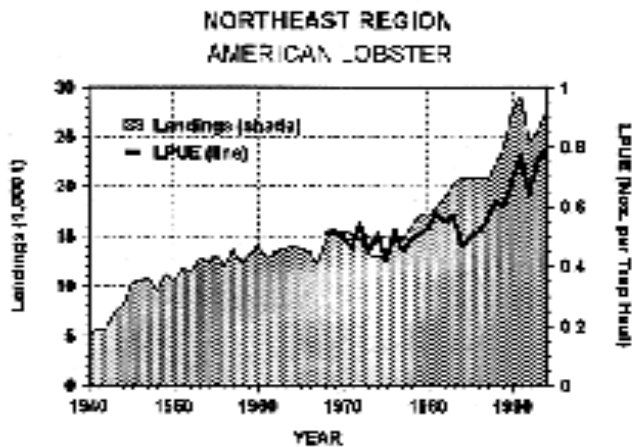


Fig. 4-1. U.S. American lobster landings and Maine landings per unit effort.

American Lobster Landings (t)

1993	25,600
1994	27,600

Management of the sea scallop fishery by the New England FMC changed markedly in 1994 as maximum meat count regulations (numbers of scallop meats per pound) were eliminated. In their place, controls on the number of days at sea and increased mesh ring sizes were instituted. The effects of these measures cannot yet be evaluated, but a comprehensive assessment through 1993 indicated that the resource was being overfished on Georges Bank and in the Mid-Atlantic Bight and was at a low overall level of abundance. Sea scallop populations are characterized by wide variability in year-class strength and little relationship among dominant cohorts between the Mid-Atlantic Bight and Georges Bank. Several strong year classes resulted in record high U.S. landings in 1990-91 of about 17,000 t (Fig. 4-2), but landings declined abruptly in 1993 to only 7,400 t and remained at that level in 1994, reflecting much poorer recruitment in recent years. Fisheries in all areas depend almost entirely on the growth of new recruits into the exploitable size range. In the Mid-Atlantic Bight, moderate year classes in 1990 and 1991 are supporting current landings. Given the rapid growth, low natural mortality rates, and early age at entry by this species into the fishery, considerable yield is currently being foregone to growth overfishing. Current fishing mortality rates also exceed recruitment overfishing definitions.

Surfclam and Ocean Quahog

These species are harvested with hydraulic dredging vessels; the majority of EEZ landings occur off New Jersey and the Delmarva Peninsula. Small quantities of them are also taken off Southern New England and in the Gulf of Maine. Fisheries for these species are currently closed on Georges Bank due to paralytic shellfish poisoning (PSP) contamination. They are managed under the Surf Clam and Ocean Quahog FMP of the Mid-Atlantic FMC. The primary management measure is a system of individual transferable quotas (ITQs) allocated on the basis of historical participation in the fisheries.

Atlantic surfclam landings increased steadily during the 1960s and early-1970s, peaking in 1974. Subsequently, a succession of poor year classes, combined with a large die-off of the surfclam resource off the New Jersey coast in 1976 led to very low stock biomasses and reduced landings. Beginning in 1977, the FMP has regulated total annual surfclam landings from the EEZ (where most landings are derived) and has addressed the significant overcapitalization in the fishery. Large year classes spawned in 1976 and 1977 off New Jersey and the Delmarva Peninsula even now comprise a significant fraction of the harvestable stock. Evidence from the most recent assessment suggests consistent but modest levels of recruitment. Under current harvest quotas, there is sufficient biomass to support surfclam catches off northern New Jersey and Delmarva for 8 to 11 years. Recent annual landings have averaged 31,800 t (Table 4-1).

Ocean quahog landings increased rapidly as the surfclam resource collapsed in the mid-1970s, and a market substitute for processed clam products was developed. They inhabit relatively deep waters of the Mid-Atlantic continental shelf and Georges Bank. In the Gulf of Maine they are found relatively nearshore in these cooler waters. Ocean quahogs are one of the longest lived (>100 yr) and slowest growing marine bivalves in the world. Current annual landings are expected to deplete the resource in existing fishable areas in about 30 years. Over the past two decades, ocean quahog fisheries have moved progressively northward with most landings now coming from the Long Island area. Large resources still exist in Southern New England and Georges Bank, but these areas cannot be easily fished with existing technology.

Northern Shrimp

Northern shrimp are harvested exclusively from the Gulf of Maine using small mesh trawls. Northern shrimp are at the southern extent of their geographical range in U.S. waters as high abundance is generally associated with low water temperatures. The ASMFC regulates the northern shrimp fishery in the Gulf of Maine; regulations control the length of the harvesting season (December to May) and the gear to be used.

ISSUES AND PROGRESS

Individual Transferrable Quota

An important issue in the surfclam fishery has been the implementation of an ITQ system which has obviated the need for complex restrictions on the amount of effort and time each surfclam vessel could fish. The total surfclam fleet has been reduced substantially since implementation of the ITQ system: from about 160 to less than 100 vessels in the first year alone. In the future there is likely to be further consolidation of fishing to a smaller number of vessels, as well as construction of new, more efficient vessels to reduce overhead.

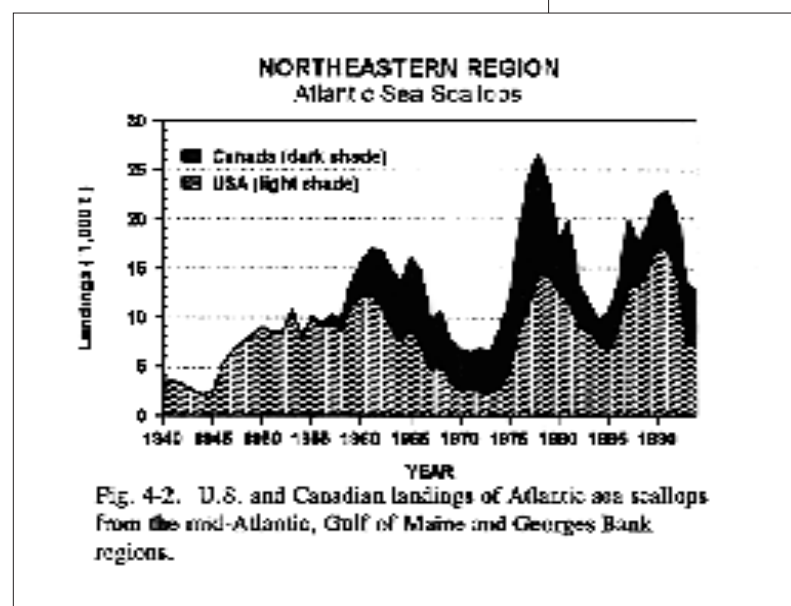
Scientific Advice and Adequacy of Assessments

Much progress in assessing the status of exploited invertebrate stocks of the Northeast region has been made in the past several years. Traditional age-based assessment techniques are difficult or impossible to apply to most invertebrates. Therefore, the focus has shifted to stage-based models in which transitions between stages are determined by growth dynamics and mortality rates. Such methods have not only proven valuable for estimation of mortality rates for scallops, lobsters, and surfclams, but also for the detection of rates of recruitment. The development of these techniques emphasizes the importance of obtaining reliable biological sampling of the catches for length composition. Biological sampling of these stocks remains problematic since, in the case of sea scallops, the product is partially processed at sea. An integrated assessment plan for surfclams, ocean quahogs, and scallops was recently completed by NOAA Fisheries and state scientists. These new assessments will provide the basis for

evaluating management alternatives, as direct controls on fishing mortality are being considered for the fishery.

Management Controls

Fishing mortality rates on sea scallops are far in excess of those generating maximum cohort yields and exceed reference points for recruitment overfishing. In 1994, the New England FMC began implementation of a plan amendment aimed at reducing fishing mortality on sea scallops. Measures include provisions to

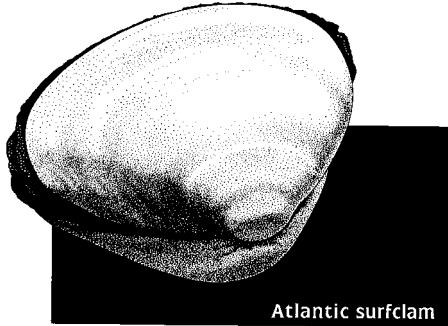


reduce fishing effort through days-at-sea reductions and a moratorium on vessel entrants, while removing the meat count requirement. Meat count regulations did not control the overall rate of fishing mortality, but redirected mortality onto older scallops. To reduce fishing mortality rates on smaller scallops, Amendment #4 included an increase in the minimum 'ring size' to 3" in the chain bag at the aft end of scallop dredges. This hopefully will compensate for the removal of the meat count requirement by reducing mortality on small scallops.

Management of American lobsters is complicated by the international trade in live lobsters from Canada. The lack of conformity of imported lobsters with U.S. minimum size limits is a major political issue. The fact that the fishery is almost exclusively supported by

Atlantic Sea Scallop Landings (t)

1993	7,400
1994	7,500



Atlantic surfclam
Spisula solidissima

recently-molted animals is another serious concern for the long-term health and stability of these fisheries. The coherence in lobster landings increases in most western Atlantic areas implies that these increases may be due more to favorable environmental conditions for the survival of pre-recruits, than to the effects of management regulation or ecosystem change in any one area. Ongoing collaborative development of management measures by government and the fishing industry is an important approach to management.

Invertebrate fisheries are likely to change rapidly in the next several years as increasing restrictions on finfish fisheries in the New England region displace groundfish harvesters

from traditional areas. In the absence of regulations, a large influx of trawlers could offset many of the measures designed to reduce fishing mortality by scallop dredgers and lobster pots.

Bycatch and Multispecies Interactions

The trawl fishery for northern shrimp has generated considerable bycatch and associated discard of groundfish in the Gulf of Maine region. Growing concern over the fate of groundfish resources has led to the adoption of a fish-excluding device (the 'Nordmore Grate') as a condition of participation in this fishery. Sea sampling effort has been directed to this fishery to determine the impact of the use of this technology on bycatch rates of groundfish. Bycatch of goosefish in the sea scallop fishery has come under increased scrutiny as a source of fishing mortality on the goosefish stock as a whole, and particularly on very small fish. □